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The Dow Chemical Company  
Midland, MI 48674

August 17, 2011

Ms. Mary Logan  
Remediation Project Manager  
U.S. Environmental Protection Agency, Region 5  
77 West Jackson  
Chicago, IL 60604

**Re: Addendum 1 Reach MM In-Channel Island Removal Action Work Plan-  
Settlement Agreement No. V-W-11-C-974 for The Tittabawassee  
River/Saginaw River & Bay Site  
Dow Submittal Number T2.RMM.2011.006**

Ms. Logan:

Attached please find Addendum 1 for the Reach MM In-Channel Island Removal Action Work Plan prepared by The Dow Chemical Company (Dow) for the Tittabawassee River/Saginaw River & Bay Site. Please let me know if you have any questions or concerns.

Sincerely,  
The Dow Chemical Company

A handwritten signature in black ink, reading "Todd Konechne".

Todd Konechne  
Project Coordinator

CC: Al Taylor, MDNRE  
Diane Russell, U.S. EPA  
Joseph Haas, U.S. Fish and Wildlife  
Greg Cochran, Dow  
Steve Lucas, Dow  
Peter Wright, Dow

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**ADDENDUM 1**  
**REACH MM IN-CHANNEL ISLAND**  
**REMOVAL ACTION WORK PLAN**  
**THE TITTABAWASSEE RIVER/SAGINAW**  
**RIVER & BAY SITE**



**PREPARED BY:**  
**THE DOW CHEMICAL COMPANY**

**AUGUST 17, 2011**  
**DOW SUBMITTAL NUMBER T2.RMM.2011.006**

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## **1.0    INTRODUCTION**

The Reach MM In-Channel Removal Action Work Plan (“Work Plan”) was submitted to the U.S. Environmental Protection Agency (EPA) and the Michigan Department of Environmental Quality (MDEQ) (collectively referred to as the Agencies) on July 25, 2011. Dow received partial approval for the Work Plan in an Agency email dated August 12, 2011. The Agencies provided additional comments to Dow during an August 16, 2011 meeting. This Work Plan Addendum provides additional information requested by the Agencies during the August 16, 2011 meeting.

## **2.0    CUT AND FILL CALCULATIONS**

During the August 16, 2010 meeting the Agencies requested additional information related to the cut and fill volumes for the permanent in-channel removal action as well as the temporary work in the flood plain to facilitate the Reach MM Island Removal Action. This information has been summarized on Table 1 and includes:

1. Calculation of the volume of material to be placed temporarily on the floodplain/floodway for the road and staging area.
2. Calculation of the volume of material to be removed and placed in the river as part of the island removal/cap/island re-construction.

A plan view map of the existing island and the extents of the proposed armor cap and reconstructed island is included as Figure 1. Cut and fill cross sections including "finish grade" for the cap and island are included as Figures 2A and 2B.

## **3.0    MODELED EFFECTS FOR CAP AND ISLAND PLACEMENT**

Dow’s consultants ran a two-dimensional hydrodynamic model developed for the Tittabawassee River to evaluate the flood water elevation impacts of the Reach MM Island Removal Action. The model was run under two conditions (before and after construction) to simulate a worse case hydrodynamic impact as a result of the cap placement and island re-construction. Even though less than 200 cubic yards of net fill in the river is planned, from the cap and island reconstruction, the net fill assumed to represent the difference between the two modeling scenarios (before and after construction) was represented by approximately 900 cubic yards. This conservative modeling exercise, using 900 cubic yards of net fill instead of 200 cubic yards of net fill, predicts the maximum hydrodynamic impact on the flood elevation to be .003 feet (.036 inches). The 900 cubic yards used in the model is more than 4 times the planned net fill volume from construction. This conservative modeling results show that the net fill in the river will not cause a harmful flood water elevation impact.

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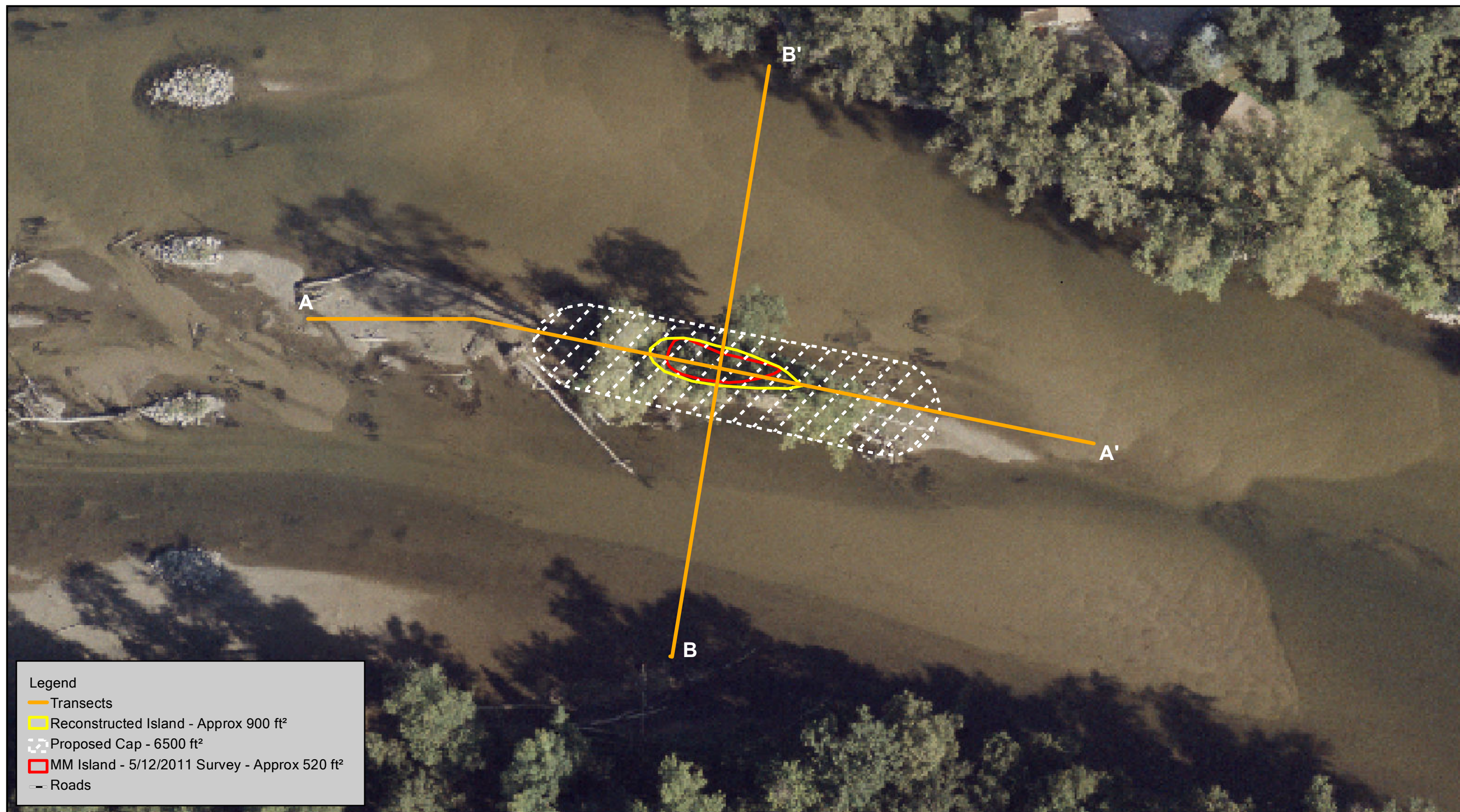
## **Figures**

**Figure 1 – Reach MM Island Plan View**

**Figure 2a – Cross Section A-A’**

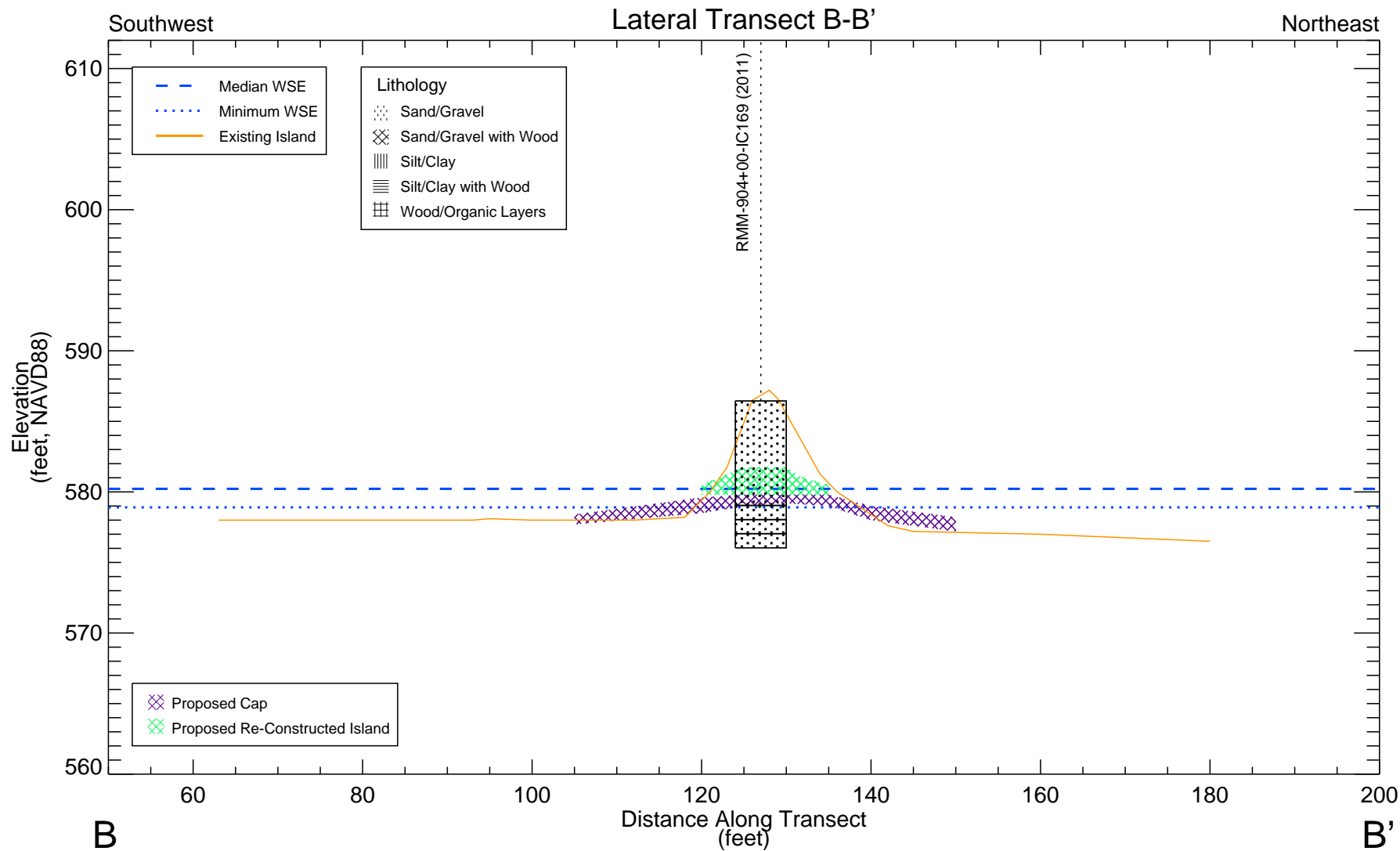
**Figure 2b – Cross Section B-B’**











### Cross Section B-B'

#### Reach MM Removal Action Work Plan

*Note: Water surface elevations (WSE) are the minimum and median near the island modeled from June to November of the 2007 - 2009 hydrodynamic model using the floodplain grid. Only cores within 10 ft of the transect are shown. Core RMM-905+00-IC120 is plotted 7 ft downstream for clarity.*

**Figure  
2B**



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## **Tables**

### **Table 1 – Cut and Fill Volumes**

**Table 1**  
**Proposed Cut and Fill Volumes**

**MM Island Access Road and Work Area Temporary Volumes < 200 CY**

#	Location	Description	Area (SF)	Depth (Ft)	Quantity	Units
1	Road and access area in 1000 flood plain	Geotextile and crushed asphalt	4000	0.83	123	CY
2	Level Road down to floodplain	Crushed asphalt			60	CY
					183	CY

**MM Island Cap and Island Reconstruction Volumes < 200 CY**

#	Location	Description	Area (SF)	Depth (Ft)	Quantity	Units
1	Cap Material	D50 - 2" Natural Stone	6500	0.83	200	CY
2	Island Fill & Planting Material	Sand topsoil mix with a TOC target of 1-2%.	1000	2	74	CY
4	Island Perimeter	Natural kicker stone - 3 to 12 inch stone	300	1.5	17	CY
5	Island Interior	Natural cobblestone - 3 to 12 inch stone (50% coverage)	500	1	19	CY
	Total Island Fill				109	CY
	Total Fill (Cap + Island)				309	CY
	Cut Material (Island)				150	CY
	Net Fill				159	CY

**MM Island Cap and Island Reconstruction Volumes - Estimates when EECA Started**

#	Location	Description	Area (SF)	Depth (Ft)	Quantity	Units
1	Cap Material	D50 - 2" Natural Stone	6500	0.83	201	CY
2	Island Fill & Planting Material	Sand topsoil mix with a TOC target of 1-2%.	1000	2	74	CY
4	Island Perimeter	Natural kicker stone - 3 to 12 inch stone	300	1.5	17	CY
5	Island Interior	Natural cobblestone - 3 to 12 inch stone (50% coverage)	500	1	19	CY
	Total Island Fill				109	CY
	Total Fill (Cap + Island)				310	CY
	Cut Material (Island)				500	CY
	Net Fill				-190	CY